

WE CLAIM:

1       1. A method for enabling location independent and location  
2       transparent interaction between a program and a user, the program  
3       having been launched at a first location and having a program state  
4       data structure for storing at least the program state, the method  
5       comprising the steps of:

6               initiating a program status request by the user;  
7               determining the current location of the program;  
8               checking the program state to ascertain program status; and  
9               interacting with said program based upon said program status.

1       2. The method of Claim 1 wherein said interacting with said  
2       program comprises:

3               retrieving, from the program, output contents to display to  
4       the user; and  
5               displaying the output contents to said user.

1       3. The method of Claim 1 wherein said interacting with said  
2       program comprises:

3               requesting input variables from said user;  
4               sending any received input values to the current location; and  
5               incorporating the received input values into said program  
6       state data structure.

1       4. The method of Claim 1 wherein the program is a mobile  
2       agent.

1           5. The method of Claim 1 wherein the program is a mobile  
2 script.

1           6. The method of Claim 1 where the user is a mobile user.

1           7. The method of Claim 2 further comprising the step of  
2 maintaining an output buffer and wherein said retrieving comprises  
3 the step of retrieving the output contents from said output buffer.

1           8. The method of Claim 1 wherein the initiating step  
2 comprises the steps of:

3           initiating the status request at a client machine; and  
4           forwarding the status request to the first location at which  
5           said program was launched.

1           9. The method of Claim 8 wherein said program comprises a  
2 mobile program which executes a portion of its code at each of a  
3 plurality of execution servers and wherein the determining step  
4 comprises the steps of:

5           transmitting the status request to each execution server at  
6 which the program has executed a portion of its code; and  
7           determining, at each execution server, whether the program is  
8 currently running locally.

1           10. The method of Claim 9 wherein each of said plurality of  
2 execution servers maintains routing information for said program

3 and wherein said determining further comprises the step, if said  
4 program is not currently running locally, of consulting said  
5 routing information to ascertain at least one successive execution  
6 server to which the program has been routed.

1 11. A method for enabling a user to provide input values to  
2 a running program before the program needs the input values,  
3 comprising the steps of:

4 maintaining a bag buffer of variable/value pairs in the  
5 program;

6 receiving a communication, including input values, from the  
7 user; and

8 temporarily storing said input values in said bag buffer.

1 12. The method of Claim 11 wherein said program subsequently  
2 searches through contents of the bag buffer to locate needed input  
3 values before requesting input from said user.

1 13. The method of Claim 2 further comprising the step of  
2 maintaining a bag buffer in the program and wherein the retrieving  
3 step comprises the steps of:

4 searching, in the bag buffer, for input values associated with  
5 the input variables;

6 updating, if found, the input variables with the input values;

7 disposing, in an input buffer, the input variables, if not  
8 found; and

9           optionally notifying the user via electronic means if no  
10          suitable values are found in the bag buffer.

1           14. The method of Claim 13 wherein the electronic means is a  
2          pager.

1           15. The method of Claim 13 wherein the electronic means is a  
2          beeper.

1           16. The method of Claim 13 wherein the electronic means is  
2          electronic mail.

1           17. The method of Claim 13 wherein the electronic means is a  
2          smart telephone.

1           18. A computer program data structure comprising;  
2            an output buffer for storing output values to be displayed to  
3          a user;  
4            an input buffer for storing values for which user input of  
5          variables is required; and  
6            a program state buffer for storing at least the present state  
7          of said program.

1           19. The data structure of Claim 18 further comprising a bag  
2          buffer for storing input variables.

1        20. The data structure of Claim 19 wherein the bag buffer is  
2        a array data structure.

1        21. The data structure of Claim 19 wherein the bag buffer is  
2        a hash table data structure.

1        22. The data structure of Claim 19 wherein the bag buffer is  
2        a tuple space data structure.

1        23. An execution shell for a mobile program comprising:  
2            a routing component for maintaining routing information  
3            regarding said mobile program;  
4            a processor component for processing user status requests  
5            related to said program; and  
6            an execution component for executing at least part of said  
7            program.

1        24. The execution shell of Claim 23 further comprising a data  
2        handling component for receiving user input and storing same in at  
3        least one data structure for said program.